Communication considerations for one health: the influence of media framing on representations of a human-bat disease conflict in the Australian print media

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ABSTRACT

The media plays a key role in shaping public definition of a human-wildlife disease conflict and the acceptance of nominated solutions. While the One Health approach has brought together science and health disciplines to manage emerging infectious diseases (EIDs), the influence of public communication has not been fully considered. This article traces the depiction of the 2011 outbreak of Hendra virus in the Australian media by examining how both journalists and other actors framed the conflict. Recognition of framing influence and the media as an actor in its own right is needed to produce a more nuanced public discourse.

Key words: Hendra, framing, human-wildlife conflict, media, bats, flying-foxes.

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Introduction

Human-wildlife conflicts pose a growing challenge for biologists, policy makers and communities. Contact between people, livestock and wildlife is increasing as the growing human population moves further into previously uninhabited areas and as wildlife recolonize previous parts of their range (Siemer, Decker, & Shanahan, 2007; Woodruff, Thirgood, & Rabinowitz, 2005). The risk of zoonotic disease from this increased contact has emerged as one of the most widespread human-wildlife conflicts, with the majority (73%) of human emerging infectious diseases (EIDs) originating from wildlife populations (Woolhouse & Gowtage-Sequeria, 2005). These conflicts pose a challenge for both health practitioners and conservationists alike in the task of simultaneously protecting wildlife and their habitats as well as preventing spillover of pathogens from wild animals to humans and livestock (Wood *et al.*, 2012). Wildlife professionals working at the interface of wildlife management and public communication have a unique challenge in addressing the potential negative impacts of wildlife-associated disease, particularly diminishing public support for conservation (Decker *et al.*, 2012).

Human health and that of domestic animals, wildlife and the environment are often seen as competing values. The One Health approach to disease management however recognizes the fundamental link among humans, wildlife and the environment and as such, promotes communication and collaboration between human health professionals, veterinarians and wildlife managers in managing EIDs (Decker *et al.*, 2011; Jack, 2012). The success of management however not only hinges on the communication between professional disciplines but also between professionals and public stakeholders. The media is considered one of the most important sources of information and opinion for public stakeholders about environmental issues (Shanahan, Morgan, & Stenbjerre, 1997) and often plays a major communication role in EID outbreaks. In this sense media engagement should been seen as an integral part of the One Health approach to disease management.

Beyond an initial crisis, the political nature of human-wildlife disease conflicts leads them to being frequently reported in the media (Barua, 2010). Here journalists can influence how the risk associated with an EID is perceived by the public (Decker *et al.*, 2011) and shape the development of a conflict between stakeholders and wildlife by the frames they use to present the issue (Barua, 2010). Media framing is a process of selective presentation, where some aspects of a perceived issue are obscured and others are made more salient in an attempt to make those pieces more conspicuous, memorable, or significant (Entman, 1993). The frames used are frequently selected by journalists in line with the media's business model or news values (McCarthy, Brennan, De Boer, & Ritson, 2008).

In the discourse of a conflict, the media not only performs the role of informal risk communicator but also become the principal arena within which the social definition, the construction and consequences of risk may be explored (Beck, 1992). However, the media is also a business with

a mandate to increase readership (Wakefield & Elliott, 2003). For this reason mass media coverage of risk often focuses on the newsworthy qualities of the issue with the end goal of appealing to the broadest audience possible (Harrington, Elliott, & Clarke, 2011; Wakefield & Elliott, 2003). To do this, newsworthy stories often resonate with widely held cultural beliefs or stir the emotions with reference to economic, political, or social conflicts (McCarthy *et al.,* 2008). Several of the 11 features of newsworthy events distinguished by Galtung and Ruge (1970) are to be commonly found in stories involving a human-wildlife conflict. These include features such as negativity (bad events are more newsworthy than good ones), unexpectedness (a rare or unexpected event), actions of the elite (events involving elite people or organisations) and personification (story can be seen in terms of individuals rather than abstractions). News stories are inevitably characterized by the particular combinations of these features or the angle journalists use to represent it (Palmer, 1998).

The media's ability to shape people's perceptions of a risk is greatest when emerging risks are characterized by limited, uncertain, or competing scientific information (Augoustinos, Crabb, & Shepherd, 2010; Kasperson *et al.*, 1988). Where there is a lack of certainty, journalists employ other news frames in a risk news story. These alternative frames have been articulated by Bennett (1999) and include:

Media Frames- Bennett (1999, p. 18-19).

1. Questions of blame
2. Alleged secrets and attempted cover-ups
3. Human interest through identifiable heroes, villains, dupes, etc. (as well as victims)
4. Links with existing high-profile issues or personalities
5. Conflict
6. Signal value: the story as a portent of further ills (What next?)
7. Many people exposed to the risk, even if at low levels 'It could be you!'
8. Strong visual impact (e.g. pictures of suffering)
9. Links to sex and/or crime

Of the nine media frames listed above, blame is highlighted by Bennett (1999) as the single most important factor in keeping a risk story in the media for any period of time. Indeed blame is often used by journalists to prolong the life of a news issue, as it provides a human interest angle to the story and accentuates the conflict already found between its nominated heroes, villains and victims (Bennett, 1999). The possibility that 'it could be you!' is a strong factor in shaping people's perception about risk, as the appeal to one's own sense of self-preservation is a key element in risk perception. This is shown in research demonstrating that the perceived seriousness of risks influences the acceptance of a risk even when its probability of occurrence is very low. As stated by J.O Zinn (2009), 'risks with a low probability but high consequences are perceived as more threatening than more probable risks with low or medium consequences.' This phenomenon arguably underpins a large proportion of news coverage communicating risk. Stories which focus on the rarity or the exceptional nature of a hazard are deemed more newsworthy than risks with a higher probability but less sensationalist outcomes (Harrington *et al.*, 2011; McCarthy *et al.*, 2008).

These news values result in news coverage frequently focusing on negative human-wildlife interactions (Corbett, 1995) and often greatly increasing after dramatic events such as human fatalities (Wolch, Gullo, & Lassiter, 1997). When journalists select and frame news stories using framing devices such as myth and metaphors they influence perceptions and, in some cases, policy outcomes of a disease conflict (Nisbet, Brossard, & Kroepsch, 2003). In this sense the media can be considered not only as a platform for the various interested parties (often termed 'actors' in social sciences) in a conflict to voice their own objectives but also as an actor within its own right (Barua, 2010).

Proponents of the One Health framework have recognized the influence of framing on social acceptance of policy and intervention practices, and have called for investigation into the framings used by a range of actors including the media, government health and wildlife practitioners, and local community (Decker *et al.,* 2011; Wood *et al.,* 2012).

This study aims to articulate common frames used by the media and government departments to depict issues within a human-wildlife disease conflict, using the 2011 outbreak of Hendra virus in Australia as a case study.

A Human-Bat-Disease Conflict and Questions of Media Representation

Bats have been of particular focus for human-wildlife-disease conflicts in recent years, having been associated several zoonoses – EIDs which can be transmitted across species boundaries, such as Hendra virus, Australian bat lyssavirus, severe acute respiratory syndrome (SARS), Nipah virus and Ebola virus (Leroy *et al.,* 2005; Luby, Gurley, & Hossain, 2009; Wang *et al.*, 2006). While bat species may be an important reservoir and vector for EIDs, they also provide vital ecosystem services. Bats perform major ecological functions in pollinating plants and dispersing their seeds, as well as playing a critical role in maintaining ecosystems through the regulation

of insect populations (Kunz, Braun de Torrez, Bauer, Lobova, & Fleming, 2011). With bat species frequently living in close proximity to human settlements and interacting with domesticated animals, conflicts often arise between the bat's intrinsic conservation value and the potential for public health impacts.

Such a conflict arose in 2011 between humans and native flying-fox species in Australia when a series of outbreaks of Hendra virus occurred. Hendra virus is a zoonotic disease which can be transmitted from its natural host (all four species of flying-fox in Australia) to horses, and then people through direct contact with infected horses (Hazelton, Ba Alawi, Kok, & Dwyer, 2013). While the specific mechanism of bat-horse transmission is unknown, scientists believe that the ingestion of pasture or feed contaminated with infected flying-fox bodily fluids is the most likely mode of transfer (McFarlane, Becker, & Field, 2011). There is currently no evidence that Hendra virus can transmitted directly to humans from contact with flying-foxes (Hazelton *et al.*, 2013; Hess, Massey, Walker, & Middleton, 2011).

Since being discovered in 1994, there have been four human deaths from Hendra virus and seven human infections (Hazelton *et al.*, 2013). However, concerns in Australia about the risks to human health escalated sharply in 2011 when 18 separate spillover events in horses occurred between June and October, 17 of which were in southern Queensland and northern New South Wales (Degeling & Kerridge, 2013; Field, Crameri, Kung, & Wang, 2012). While no humans were infected in this cluster of infection events, it did result in the discovery of a pet dog with a naturally acquired infection (Hazelton *et al.*, 2013). A protective vaccine for horses was unavailable during this period with the first commercial equine vaccine for Hendra virus launched in November 2012 (Hazelton *et al.*, 2013).

Like other EIDs, changes in the occurrence and cross-species transmissibility of Hendra virus is likely to be dependent on the impact of human activities and environmental factors (Jones *et al.*, 2008). Indeed the continuing pressures placed on flying-fox populations by drought, native vegetation clearing and expanding urbanization are potential factors that may have led to the emergence of this disease (McFarlane *et al.*, 2011). Restrictions in their normal food sources have not only placed populations under nutritional stress but also brought flying-foxes in closer proximity to people as they are increasingly forced to rely on commercial orchards and urban gardens for food (Plowright *et al.*, 2008). Food and habitat scarcity has also lead to the formation of permanent or semi-permanent camps in residential and agricultural areas (Degeling & Kerridge, 2013). Many regional communities living with these colonies already considered flying-foxes to be a noisy and unhygienic pest and the hostility towards these native animals swelled as the establishment of new of flying-fox camps in urban areas gave the misleading impression that these populations were increasing (Degeling & Kerridge, 2013).

Numerous mitigation strategies to prevent infection were nominated during the discourse of the 2011 Hendra virus spillover events. Horse husbandry strategies, such as placing horse feed and water under cover, fencing off trees so that horses would not come into contact with areas likely to contain flying-fox secretions and isolating sick horses were promoted by government departments. Other actors promoted more controversial strategies such as the removal of flying-fox colonies from towns and the culling of flying-fox populations. These were often linked to concerns regarding not only contact between flying-foxes and horses but also the perceived danger of direct contact between flying-foxes and humans. Although deemed by scientists as highly unlikely or impossible, many communities feared that Hendra virus could infect humans through direct contact with flying-foxes or through the contamination of domestic water supplies from nearby colonies. These human welfare concerns and the call to cull flying-fox populations generated the biggest debate and controversy in the media and as such were the most common topic of media coverage.

This conflict of human welfare and conservation values, and the communication attempts to negotiate this issue in the media, is the focus of this research project. This study analyses how journalists, government departments and other actors framed representations of the causes, nominated solutions and consequences of Hendra virus.

Method

To identify Australian newspaper coverage of the human-flying-fox conflict in regard to Hendra virus, the database FACTIVA® was searched. The keywords "Hendra" and "Flying-fox" or "Bat" connected by the Boolean operator "AND" were used to search for relevant news articles within the Australian states of Queensland and New South Wales (including articles published nation wide) where the conflict was occurring. Flying-foxes were first identified as the natural host of Hendra virus in 1996 (Young *et al.*, 1996). While the disease received considerable media coverage since then, Degeling and Kerridge (2013), in their examination of "Hendra in the news", expressed surprise that little media attention was paid to the link between populations of flying-foxes and Hendra virus until 2011. To focus on the time frame where the peak of media coverage regarding the outbreaks occurred, including media reporting of cases prior to confirmation of the diagnosis, a news filter limiting content to the period 1st June through to 31st July 2011 was applied identifying 499 articles including both news articles and newswires. Newswires, such as the Australian Associated Press, were included in the search as they are known to play a vital role in newspaper reporting (Antilla, 2005). Letters to the editor (n = 92), fact sheets (n = 1), advertisements for information nights (n = 2), content summaries (n = 2) and article duplications (n = 6) were removed from the database. Articles which focused on the medical containment of the disease and not the

link between flying-foxes and Hendra virus (e.g. articles which briefly mention flying-foxes as the likely source of the disease or refer to flying-foxes only in the capacity of Hendra virus being a "bat-borne disease") were considered to be not substantially related to the human-wildlife conflict (n = 122) and were also removed from the sample. The final sample consisted of 274 articles. This final pool of news articles was sourced from one national newspaper and newswire (n = 49), six state newspapers (n = 40) and 74 regional newspapers (n = 185).

Media releases referring to Hendra virus outbreaks or the associated management of flying-fox populations were obtained from the public websites of relevant government agencies in New South Wales and Queensland. A total of 38 media releases distributed during June and July of 2011 were retrieved from three state government departments. These departments were Biosecurity Queensland (n = 25), the NSW Department of Primary Industries (DPI) (n = 10) and Queensland Health (n = 3). It needs to be noted that neither of the environmental departments for each state (i.e. the Queensland Department of Environment and Resource Management (DERM) and the New South Wales Department of Environment and Climate Change (DECC)) generated any media releases regarding Hendra virus or the associated flying-fox management issues during the examined time period.

A typology of emergent frames employed to discuss the conflict and its associated objectives was developed from the article pool using an interpretive packages approach. Gamson and Modigliani (1987) describe a media frame as a central organizing idea or story line applied to a controversy that gives meaning to an unfolding series of events. Such media frames can suggest what the controversy is about and help the audience to interpret and shape opinions about the issues involved (Nisbet *et al.*, 2003). Within the interpretive packages approach, framing devices suggest how to think about an issue, and reasoning devices justify what should be done about it. Five framing devices are used in the interpretive packages approach to articulate the elements of a frame being employed in an article. These (framing devices) include: metaphors, exemplars (i.e. historical examples from which lessons are drawn), catchphrases, depictions, and visual images. Together these framing devices construct the core organizing idea or frame used to make sense of the relevant events or issues (Gamson & Modigliani, 1987).

Three reasoning devices are also used in this approach to articulate the reasons behind a nominated solution in a media representation. These reasoning devices include roots (i.e., a causal analysis), consequences (i.e. a particular type of effect), and appeals to principle (i.e., a set of moral claims) (Gamson & Modigliani, 1987). Together these framing and reasoning devices articulate the emerging frame used. Using this approach, with the exception of visual images as a framing device, a typology of frames was developed. The entire sample of news articles (n = 293) was analyzed to develop this typology of frames and each frame was coded as present or absent within the article.

In addition, each article was examined to identify the primary actors involved in framing the conflict and the prevalence of their apparent standpoints or objectives within regional, state and national media. Primary actors were defined as the sources of information referenced in the articles. Such sources were either individuals who had been interviewed by the journalist, or referenced material from reports, media releases or statements from organisations or groups. As well as defining the primary actors in the discourse of the human-flying-fox conflict, the frames employed by the various actors to represent their own objectives were analyzed. To further analyze the representation of objectives held by government departments, the same "interpretive packages" approach was also used to analyze government media releases regarding Hendra virus and the human-flying-fox conflict.

Results and Discussion

The news media and the sources they cite are able to shape perceptions and have an impact on interventions nominated within a conflict through the various framing devices they have available to them. The impact of these devices was evident in the sample of newspaper coverage of the human-flying-fox conflict ignited by the 2011 Hendra virus outbreak. Five distinct frames emerged when the news articles were analyzed: risk, mitigation, demonization, conflict and defence. These frames however were not employed equally by journalists both within and across regional, state and national media (Figure 1). Although identifiable these frames demonstrated some degree of overlap between one another, and are discussed.

Demonization

News articles that employed this frame were not neutral in outlook; instead they vilified the flying-fox and highlighted the perceived harm it could cause. These articles characterize the flying-fox as a demonic animal with framing devices such as colloquial language and reference to myths or cultural beliefs associated with bats. Headlines where this frame was featured typically read similar to "*Residents Fear Foul Bat Plague*" (Prain 2011a, 30 June, p. 7) or "*Bats Out of Hell? - Mayor Blames Boonah Camp for Virus*" (Weston 2011, 10 July, p. 12). While this frame was the third most prevalent frame found in the news articles, featuring equally across regional (30% of articles, n=185), state (35%, n=40), and national (31%, n=49) news (Figure 1), its impact could be argued to be much greater due to its resonance with existing western beliefs that bats are evil, disease carrying animals that are to be feared; this fear was used help to draw attention to the articles and resonate with a wide audience.

Blame was a key component of this frame, with flying-foxes depicted as the primary cause of the Hendra disease risk, despite the fact that there have been no

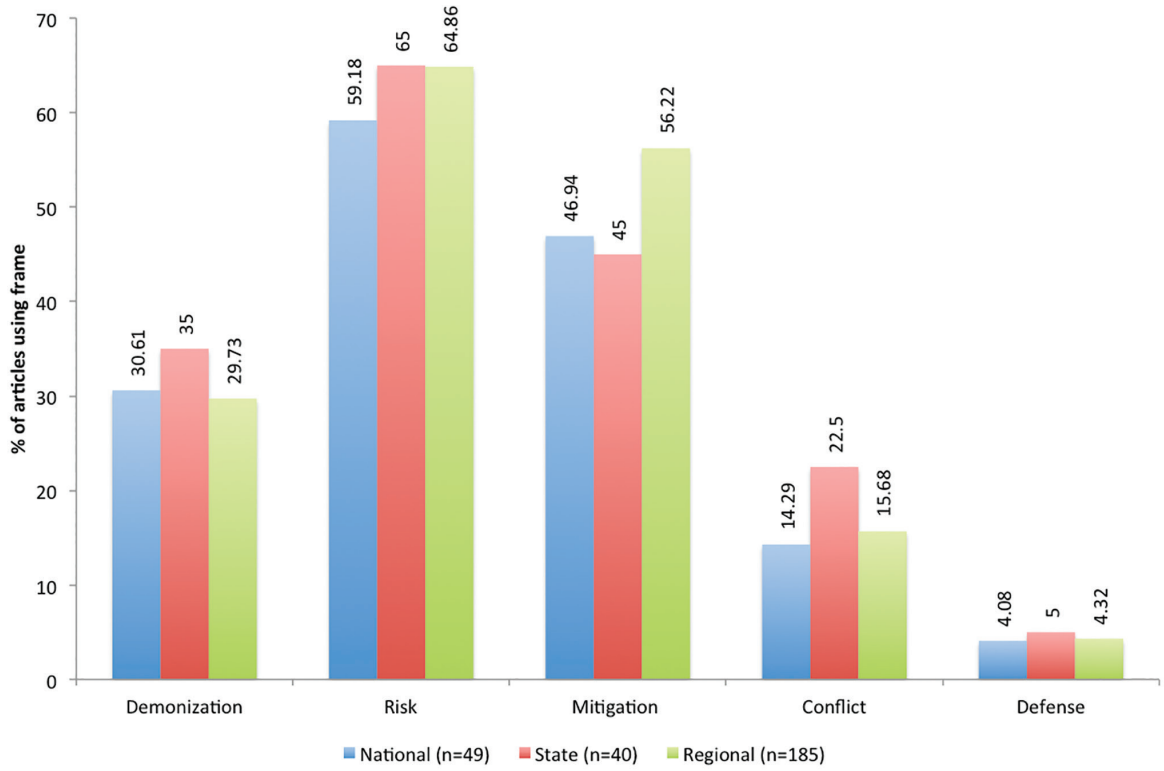

Figure 1: Frames identified within the human-flying-fox conflict by national, state and regional media.

reported cases of humans contracting the disease directly from them. The flying-fox was depicted as the antagonist or disease-carrying villain within many stories, with journalists routinely pitting them against horses and people (primarily veterinarians, horse owners and concerned local residents) who were usually portrayed as powerless victims. This use of blame helped to set up the issue as debate on moral principle – isn't human life more important than that of animals? While the demonic frame was used to appeal to the principal that human health is paramount over flying-fox conservation, horses, which are the intermediate host for the disease, did not undergo the same character assassination. The portrayal of horses as victims, the same as humans, may partly be due to the fact that horses become ill and die from the disease, unlike the flying-foxes, which do not normally show clinical signs when infected by the virus. The sympathy generated among audiences and the historical relationship between horses and humans is likely to have influenced the characterization of horses as victims as opposed to being a part of the disease threat to people.

These causal reasoning devices were emphasized by the use of negative connotations and metaphors. Many articles used derogatory or negatively loaded words in direct reference to flying-foxes, or in highlighting the anguish and stress felt by local residents towards the perceived risk posed by bats and in their attempts to move them away. Journalists framed news articles by using words like 'hordes' and 'banish' to invoke loathing, blame and wrongdoing, therefore perpetuating the demonic characterization of the flying-fox.

Risk

Risk was the most frequently employed frame in the media representation of the Hendra-virus issue, featuring equally across regional (65%, n=185), state (65%, n=40), and national (60%, n=49) news articles (Figure 1). This frame included two sub-frames - '*it could be you!*' and *scientific controversy or uncertainty*. Although identifiable as independent, the *scientific controversy or uncertainty* sub-frame often had some degree of overlap between the central frame and the '*it could be you!*' sub-frame within the news articles.

The central frame was primarily concerned with describing the consequences of a Hendra virus infection, i.e. the risk of dying. This is different to the risk of becoming infected, which is explored in the "*it could be you!*" sub-frame. Journalists tended to depict the risk of Hendra virus to the public only in terms of the risk of death to horses and humans once infected (a reasoning device) by using historical examples (exemplars) to demonstrate the severity of the disease. Many articles stated this as the number of people who have died from the Hendra virus in the past – four out of seven infections. This numerical demonstration risk of Hendra virus to humans is misleading as it does not qualify the risk of contracting the disease in the first place, omitting information on the time frame or number of exposures over which the small number of infections or deaths had occurred. Hendra virus is scientifically known to be quite rare (with only seven infections occurring out of the thousands of people known to have been exposed). This lack of qualification around the disease risk in the news media made it appear more prevalent than it is scientifically known to be.

'It could be you!' sub-frame

This lack of qualification around the scientific probability of contracting Hendra virus is used to appeal to the fears of the audience. Such fears are raised by journalists emphasizing the risk and uncertainty associated with exposure to the disease (usually by omitting any qualifying statements about the risk of contraction) and amplifying possibility that "*it could happen to you!*"

This sub-frame built upon the central frame by using anecdotal personalization to create further human interest in the story. The use of personal narrative or testimonial within this framing device put a human face to the disease risk and amplified the emotions associated with it, primarily fear. Journalists typically employed this sub-frame when representing the fearful views of non-experts such as affected or concerned landowners, residents or non-specialist veterinarians.

Scientific controversy or uncertainty sub-frame

It is clear that throughout the sample period the media attempted to demonstrate the lack of scientific knowledge about the disease. The uncertainty surrounding both the mode of transmission of Hendra virus between flying-foxes and horses, and the question of whether flying-foxes are the only native animals to harbor the virus amplified the other risk frames. In communicating this uncertainty this sub-frame again appeals to audience's emotions, primarily fear. Devices such as metaphor and anecdotal personalization were used to express this fear about uncertainty.

An example of this can be found in an article featured in The *Warwick Daily News* (Newley, 2011) quoting a local veterinarian. Chris Reardon of Warwick Vet Services said the Hendra virus made him feel like *'a canary down a mineshaft.'* 'The level of transmission is low, but the outcomes can be fatal' he said. *He said it wasn't known exactly how the disease was transferred from flying-foxes to horses,* but the animals needed to be in close proximity to each other." (p. 2)

It is within the uncertainty sub-frame that the media and personalities such as politicians can draw links between the news story and other high-profile issues. Indeed the media and politicians in this case took the chance to link the uncertainty surrounding the Hendra virus risk with other flying-fox management issues such as crop damage in orchards, although the two issues are not inherently linked.

Mitigation

The mitigation frame focused on actions taken to mitigate the human-flying-fox conflict. It employed several reasoning devices including an analysis of the known causes of infection (mainly horse exposure to flying-fox bodily fluids), descriptions of the effect of virus exposure in horses and humans, and details how to address these known causes and effects. The mitigation frame was the second most employed frame by journalists, featuring prominently in regional media (56%, n=185) as opposed to state (45%, n=40) and national (47%, n=49) media (Figure 1). The increased use of the mitigation frame in regional media coverage is likely to be due to the fact that regional audiences were more likely to have close contact with horses or flying-fox colonies.

While the mitigation frame was identifiable across the majority of news articles, the negotiation between the different nominated mitigation strategies introduced some degree of overlap between this frame and other frames. For example, within the mitigation frame, news articles often used anecdotal personalization and vivid depictions as devices to describe the effect of the Hendra virus in horses and humans. Occasionally these depictions aligned this frame with the fear found in other risk and demonization frames.

"The horse was like an upturned beetle that couldn't find its feet. When it tried to stand it simply rocked from side to side. Its thrashing head continually struck the rocky ground while blood bubbled from its mouth. This was the specter-confronting veterinarian Peter Prenzler after he was called to the side of the distressed animal at a Mt Alford property, south-west of Brisbane, on June 20." (Berry 2011)

Highlighting the Hendra virus in this manner not only created an overlap of frames (such as demonization – flying-foxes are to blame for this horror) in the description of the virus' consequences but also could have led to these frames influencing the audience's interpretation of the media's evaluation of the nominated solutions.

Horse husbandry actions were the most common mitigation strategies suggested during the June-July 2011 time frame. However, these mitigation strategies were largely viewed as intermediate solutions until scientists could gain a greater understanding of Hendra virus and offer other solutions with "better" protection, such as a vaccine. Indeed several articles demonstrated the small sub-frame of *scientific progress* where the progress made in funding and research on the vaccine was detailed. The second most common solution nominated by several stakeholders (mainly horse owners, local residents, some local and state politicians) was the removal or culling on flying-fox populations. It is with these suggested mitigation strategies where the conflict lay, as the disturbance or killing of flying-foxes clashed with the environmental values held by environmental groups, scientists and to some degree government agencies. Beyond environmental values, these mitigation methods were also in conflict with state and national environmental protection laws; this clash of values and legislation often linked the mitigation frame with the conflict frame.

Conflict

The conflict frame focuses on the clash of opposing views or arguments within the discourse of an issue. Within the human-flying-fox conflict, this frame is usually used in reference to political discussion around nominated

solutions to the Hendra virus problem, namely the culling of flying-fox populations. This frame highlights and enhances the conflict found within the negotiation by using phrases of a combative nature as a framing device.

Such conflicts were most prominent in state media (23%, n=40) as opposed to regional (16%, n=185) or national (14%, n=49) media (Figure 1). This increased use of conflict frames in state newspapers is not surprising, as the political discourse surrounding the Hendra virus outbreak was largely played out at the state level, unlike the regional level where political discourse on the issue was largely harmonious. Additionally, regional levels of government had no authority to make policy decisions on mitigation measures as that power is largely held by the state. This left the political debate of how to balance public health and environmental protection responsibilities to the state governments and thus was reflected in frames employed by the state media.

Defense

Flying-foxes were rarely portrayed in a positive light with very few media articles employing this frame aimed to defend flying-foxes from the negative assertions made by demonization frames. To counteract this negativity, the defense frame used storylines that highlighted the environmental importance of flying-foxes so as to appeal to the principle that a wild animal can have value. This usually took the form of listing the ecosystem services the species provides and detailing the possible consequences of losing such services. This approach however often took on an educational tone and focused on abstract values. The minimal use of this frame in the regional (4%, n=185), state (5%, n=40) and national media (4%, n=49, Figure 1) may be partially attributed to the lack of *personification* (and thus news value) found within this frame. In a more direct attempt to rebut the negativity of the demonization frame, many actors used derogatory or negatively loaded words, such as hysteria, to describe some of the reactions to the conflict. Although infrequent, this in turn generated overlaps between this frame and the conflict frame.

Representations of key actors

Journalists are not the only ones to use frames: all actors – including journalists – within a conflict use framing devices to describe the problem and nominated solutions. Frames used by primary actors to define a problem, either in their communication efforts or actions can influence the frames employed by journalists in the media representation of the conflict. Five primary actors (excluding journalists) were identified in the media representation of the flying-fox conflict. They included politicians, domestic and commercial horse owners, veterinarians, scientists and environmental non-profit organizations, and government departments.

Politicians

Politicians quoted in news articles were predominantly mayors of regional towns or state MPs holding independent or opposition seats in Queensland and New South Wales. This group largely advocated for flying-fox culling as a mitigation solution, imparting human welfare and economic objectives as reasons behind their position. While recognizing the cost that Hendra virus poses to horse owners, politicians often made further connections to the damage sustained to the orchard industry by flying-foxes and the nuisance caused by colonies (also called camps) in residential areas to justify their call to the state governments to allow permits for farmers to cull. In support of many of their arguments, individuals from this group often claimed (n = 25) that flying-fox populations were increasing in number, a claim that is incorrect (Eby, Richards, Collins, & Parry-Jones, 1999; Parry-Jones, 2000; Department of Environment Climate Change and Water NSW, 2009).

Politicians were the leading force in changing the dialogue from a discussion of distinct health and environmental issues relating to flying-foxes to one of an all encompassing moral question – us or them? Blame and vilification of flying-foxes were the primary elements of the demonization frame used by this group, with 75% of all articles quoting politicians (n=70) making use of this frame. Risk frames were also frequently employed in articles quoting politicians (63%) particularly the sub-frame *"it could be you!"* in reference to the need to protect people in rural towns from Hendra virus as well as those who have close contact with horses.

The arguments made by politicians are likely to be an extension of sentiments expressed by local horse groups or negatively affected residents. Lobbying from these local constituents or the opportunity to address the already-existing, but unrelated, high-profile issues of orchard damage by flying-foxes and nuisance colonies in residential areas is likely to have inspired both local and state politicians to enter the public debate. Indeed these issues received greater media coverage than they had previously due to the way these actors connected it with the Hendra virus outbreak. This in turn further fuelled the debate on flying-fox management solutions due to the greater scope and audience appeal it added to the human-flying-fox conflict.

In line with the media frames outlined by Bennett (1999), these conflicts were highlighted and enhanced by journalists' in several of the news articles. In addition to the newsworthiness of conflict, journalists' ability to gain access to local politicians (i.e. their routine access to mayoralty as part of the daily or weekly rounds) is also likely to have increased the prevalence of politicians' views in the media. The relatively high percentage of articles quoting local politicians such as mayors in the regional media may be an indication that journalists see members of this group as an easily accessible source as well as being representatives for the objectives of their local constituents.

Horse owners and industry

Horse owners (n=74) were one of the predominant groups represented in the Hendra virus media discourse, quoted in 27% of all news articles. This group can be divided into two main sections; those who kept horses as domestic pets or as part of a small business, and the thoroughbred racing industry. Horse husbandry practices varied between these two groups. Horses owned by small businesses or pet owners were largely kept in open paddocks with tree coverage, while the regulated practices of the racing industry required that horses were mostly fed and stalled under cover. These differences are likely to have been the reason that almost all cases of Hendra virus occurred in horses kept as domesticated pets or as a part of a small business. As such, the beginning of the media discourse around Hendra virus saw the racing industry express a lack of concern about the disease as they felt their horse husbandry practices were sufficient. As the discourse continued and other domestic or small business horse owners (n=54) presented their concerns with increasing use of risk (79%) and demonization frames (25%), the racing industry slowly changed its stance from vigilant but unconcerned to high risk and calling for a flying-fox cull. An example of this is the "Trainers push for bat cull" article published in the *Northside Chronicle* (Walker 2011, 20 July, p.5).

Veterinarians

The use of veterinarians as news sources was most prominent in regional media (22%, n= 185) compared to state (8%, n=40) and national media (10%, n= 49, Figure 2.). This is likely due to the ease with which they can be accessed by regional journalists and the inherent expert nature of their profession. Veterinarians largely advocated horse husbandry measures to prevent infection of both horses and humans, with a few going as far as to blame "sloppy management" by horse owners for the increase in infection events (Bateman & Strudwick, 2011, p. 3). The call from veterinarians to all horse owners to be extremely vigilant, along with statements that reminded audiences that infection "could happen anywhere" or is "only a matter of time" often extended risk frames within news articles, particularly the sub-frame *"it could be you!"* The anecdotal personalization by veterinarians expressing their concerns for their own personal safety in treating sick horses also contributed to risk frames being employed by journalists in 80% of news articles that quoted this group. This risk frame was also influenced by the actions of several veterinary practices where it was reported that veterinarians were refusing to treat sick horses due the risk for their personal safety (Elks & Owens, 2011, p. 3).

Scientists and environmental non-profit organizations

Environmental advocates and scientists, including bat experts, were poorly represented in the media discourse of the human-flying-fox conflict, with this group being represented in only 11% of all news articles. Regional (16%, n=185) and state media (15%, n=40) represented this group more than national media (10%, n=49) largely due to quotes from local wildlife rehabilitators and small bat conservation groups (Figure 2.). Predominately using defence frames within their statements, members of this group cited the threatened status and the ecological importance of the flying-foxes as arguments against proposed cull and removal strategies. Often these statements were very short with little explanation of how the culling of flying-foxes could directly impact the environment or humans. For example, *The Queensland Times* newspaper stated "The RSPCA Queensland's Wildlife operations manager Dr. Jon Hanger said the flying foxes were importantly ecologically and should not be culled" (Jackson, 2011).

While some members expressed human-wildlife co-existence values, surprisingly animal rights values were not voiced or published. This may be due to journalistic selection of quotes or due to the influence of conflict frames expressed by other actors using derogatory terms like "Greenies" to describe members of this group. In the competitive peer review culture of the scientific world a scientist's credibility is based upon their scientific accuracy and objectivity. To be called a "Greenie" or accused of letting anything other than scientific fact (such as emotion) influence a scientist's opinion on a topic would viewed by the scientific community as highly unprofessional. As such animal rights may not have been mentioned by members of this group in an attempt to avoid their stance being tarnished with the negative association of being over-emotional or representing "bleeding hearts". This however did result in a lack of personification in their position, which may have impacted on the amount of coverage they received in the media. While those affected by the virus such as horse owners could represent their position through personal stories, the presentation of environmental or conservation arguments was portrayed in abstract terms. While scientists may feel comfortable defending their position using peer-reviewed science, this type of communication often does not meet the news values sought by journalists and therefore can restrict the media coverage of their position within a discourse.

Government departments

Representatives from Biosecurity Queensland, Queensland Health and the NSW Department of Primary Industries were the prominent sources for Hendra virus information in regional (30%, n=185), state (45%, n=40) and national media (49%,, n=49, Figure 2.). These departments were primarily concerned with addressing the human welfare concerns of the community through the communication of horse husbandry measures to prevent Hendra virus infection events, and with the frequent reporting of identified Hendra virus cases and their associated quarantine and testing procedures; this focus on human welfare issues was primarily demonstrated in the media releases they distributed.

In line with disaster communication theory, media releases from these government departments during the Hendra virus outbreak primarily aimed to inform

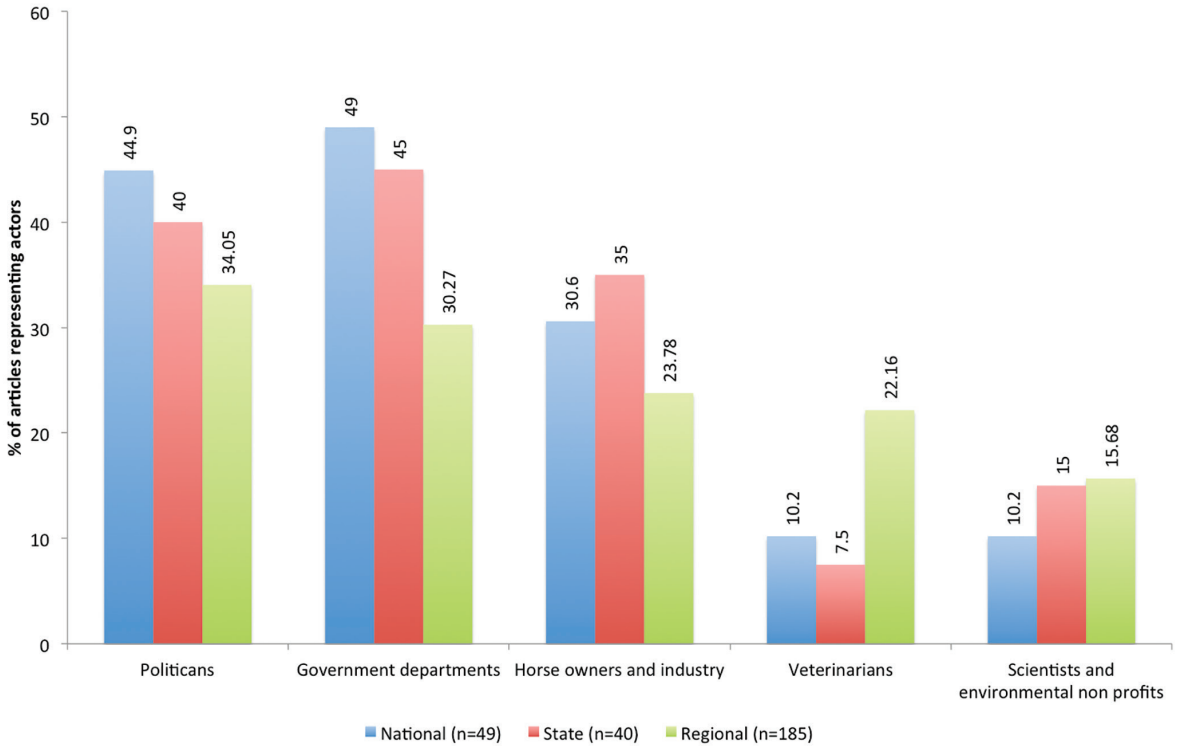

Figure 2: Actors identified within the human-flying-fox conflict represented in national, state and regional media.

those at risk about the impending or current threat and urged them to undertake actions to protect their own safety and that of their livestock (Comrie, 2011). While risk and mitigation frames were used to convey these messages, the lack of qualification around the risk of contracting Hendra virus and the focus on reporting the increasing number of people being tested for the disease (although they have low risk of contraction) in these media releases may have elevated the "*it could be you!*" risk sub-frame in the media beyond its intended level.

Media releases from these three departments also primarily reported suspected or confirmed cases of Hendra virus in horses and the associated quarantine measures. While flying-foxes were mentioned as the source of the disease in 60% of these media releases, qualifications around the risk of horses and humans contracting the disease (i.e. its rarity and the lack of documented bat-human transmission) were only made in 21% of media releases. Of these qualifications, the majority of them addressed the issue only brief in statements such as "Hendra virus can spread from flying-foxes to horses and, rarely, from horses to people" (Department of Primary Industries, 2011). This lack of qualification may have contributed to the focus by journalists on the severity of the disease (i.e. risk of death) and its connection to flying-foxes, as well as their frequent omission of qualifying statements about the rarity of human infection. None of the media releases from these three departments addressed the human-flying-fox conflict beyond horse husbandry recommendations (made in 43% of media releases) to minimize the contact horses had with flying-foxes. Statements made by departmental spokespeople also followed this trend with most not referring to or addressing the environmental concerns involved in the human-wildlife conflict. The only exception to this was the infrequent connections made between the no cull policy of the state government and the horse husbandry actions promoted by these departments in statements made by government ministers or the Queensland Premier.

Frames employed by these departments in their media releases or public statements may have differed from those presented in stakeholder engagement sessions. The *Nambucca Guardian News* reported that conservation concerns were addressed in stakeholder engagement sessions held by these departments, with some attending community members stating "not enough time was devoted to the health aspects of humans. It was more like trying to protect the fruit bats than providing a workable solution" (O'Neil, 2011, p.3). It seems that defence frames potentially used by department officials in stakeholder sessions did not flow through the news articles covering the issue. This demonstrates the importance of consistent and clear messaging in all communication efforts, in both media and community engagement. It also could be viewed as an indication of how the media is not a simple conduit of information and how journalists can be selective in the frames they employ in news articles.

This poor coverage of conservation concerns and potentially selective use of frames by journalists may be a result of a lack of media engagement by government environmental departments. Unlike the other departments, the Queensland Department of Environment and Resource Management (DERM) did not publish any media releases and made very few statements, being referenced in only 3% (n=274) of the media coverage. While DERM expressed its objection to flying-fox removal or cull actions through

interview statements made by the Queensland Premier and several of its spokespeople, these arguments were poorly represented in the media coverage. While a small number of the statements made by DERM employed a defence frame highlighting the ecosystem services flying-foxes provide and the environmental laws that protect them, the majority of statements made by the government against culling or flying-fox removal did not reference animal rights, co-existence or environmental value issues. Instead the arguments put forward were based upon how the implementation of culling or flying-fox removal measures would be ineffective and could risk further spread of the disease. In effect, these statements did very little to counterbalance the demonization and risk frames associated with flying-foxes in the media. Adding to this, confusion regarding the policy position on such mitigations strategies occurred, as DERM released information about the conditions in which municipalities could apply for flying-fox removal permits at the same time that they were making arguments against them. Such contradictions led to questions about the scientific certainty of claims that flying-fox removal could spread the disease and insinuations of a cover-up regarding the alleged lack of science backing the Queensland Government's stance. With the resulting scientific uncertainty, risk and conflict frames dominating the media, the efforts made by DERM did very little to address the conservation issues of this human-wildlife conflict. As such this is likely to have contributed to the substantially one-sided representation of the human-flying-fox conflict in the media, shifting focus away from a reasoned discussion on solutions to an environmental problem to a question of moral principle focused on elements of fear, blame and 'us versus them' themes.

Conclusions

Like most human-wildlife conflicts, the conflict posed by the Hendra virus outbreak was a complex issue, involving multiple actors and objectives. The media is one actor that plays a prominent role in informing the political discourse surrounding a conflict and reinforcing public perceptions. Journalists commonly work from predefined frames or news values that provide them with themes to shape stories about events, people and issues (Barua, 2010; Shoemaker & Reese, 1991). In line with other research in this field (Barua, 2010), the results of this investigation indicate that these news values and frames influenced the level of news coverage and salience given to certain actors and their objectives. Certain objectives or values expressed by actors within a conflict may inherently conform to these journalistic news values better than others and thus receive greater media coverage. An example of this can be found in the coverage of the concerns expressed by horse owners and local politicians in the human-flying fox conflict. These human welfare values concerning the protection of humans and horses from infection naturally fit with the news values of personification and negativity, and inherently create human interest through identifiable victims and villains. The objectives of these actors were able to be expressed in terms of personal experiences, which allowed journalists to make use of the '*it could happen to you!*' risk frame, and also encompassed emotion. All these elements led to these objectives to be considered as newsworthy by journalists. In contrast, the conservation values expressed by scientists and environmental groups did not inherently appeal to news values. Objectives expressed by these groups tended to be articulated in abstract terms with a lack of personification or emotion. These conservation objectives relinquished the blame and villain characterization placed on the flying-fox in the Hendra virus issue. Without inherent appeal to common media frames (such as demonization and risk) or news values, journalists most likely found these conservation values harder to shape into an appealing story for their audiences. Thus these objectives or values received little media attention. This is further shown in the few articles that did feature environmental groups trying to address the demonization flying-foxes. In these articles, it was the conflict frame used by environmental groups more than the environmental explanation that gained media attention, with some actors using derogatory words, like *hysteria,* to describe their opponents' reactions and views on the issue. With the reality of the media industry relying on news values and frames to appeal to audiences, actors that express these conservation values need to work harder to match their messages to the news values of the media if they wish to receive greater media representation in a conflict.

Frames employed by journalists not only have the ability to shape the representation of the problem but also have the ability to influence the solutions nominated. For example, the violent mitigation solutions nominated, such as the culling of flying-foxes, were likely to have gained greater acceptance in the wider community through their alignment with the demonization and risk frames predominantly used by journalists in their representation of the problem. However journalists are not be the sole creators of these frames, as they have to be equally understood and accepted by the audience for them to operate. The ability of journalists to select and promote certain frames which impact the definition of the problem however may in turn influence its solutions, giving them a constitutive role in shaping the policy and practical responses that may be nominated. In this sense the media can greatly influence the outcome of a conflict and as such should be recognized as an actor in its own right.

Other actors within a conflict however are not powerless to influence the media representation of their objectives. The increasing reliance of journalists on others for information and problem definition gives actors an opportunity to influence the media representation of the central problem found within the conflict through proactive communication or public relations. This was evident in the findings of this study, where government departments, which produced media releases, were clearly the most reported news sources

on the Hendra virus issue. While the predominance of these departments as news sources may be largely to do with the authority they held in managing the Hendra virus outbreak, their influence on the agenda and frames employed by the media is apparent from the analysis of their media releases. These predominantly employed mitigation and risk frames, which were also dominant in regional, state and national media. However, the widespread uptake of these frames from their media releases also emphasizes the need for organisations to ensure that the frames and content of their media releases are clear and in line with their core message. If not, misinterpretation may lead the media to employ alternate frames or set a different agenda within their articles than that intended. An example of this is the lack of clarity found within the government media releases in articulating the different risk factors in the issue. Government media releases failed to clearly distinguish between the risk of horses contracting Hendra virus, the risk of humans contracting Hendra virus from horses and the risk of severe consequences for humans once infected. This lack of clarity was in turn reflected across the majority of news articles, leading the media to focus on the risk which best met their news values of negativity and '*it can happen to you!*' (i.e. the severe consequences of Hendra virus infection). This also allowed the objectives of other actors, such as horse owners and local politicians, to gain greater media coverage and influence over the problem definition in news articles, as the frames selected by journalists aligned with those presented in their concerns.

While the One Health framework has made great strides in trying to develop a coordinated approach among veterinary, public health and environmental disciplines in dealing with EIDs, public communication has until now been largely left out of the equation. This study demonstrates the influence that media framing can have not only on the public definition of an EID problem but also on the acceptance of nominated solutions. The identification of key frames in this study and their relation to actor's cultural backgrounds and political-institutional positions is an important step towards understanding the complexities of public discourse regarding EID. These key frames are consistent with those of other similar conflicts found both within the literature, such as the human-elephant resource conflict in India (Barua, 2010), and current events, such as the human-badger disease conflict connected to the current outbreak of bovine tuberculosis in the United Kingdom. As such these frames are likely to be common across most human-wildlife conflicts, particularly those involving disease, and should be considered in any public communication planning by One Health advocates.

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